## PROJECT PROPOSAL

IS53047A: Final Year Project In Computational Arts (2020-21)

Gabor Paszti - Student Number 33593941

Tutor: Prof. Atau Tanaka

Goldsmiths, University of London

30 November 2020

# THEME: EXPERIMENTATION WITH MACHINE LEARNING TITLE: FLOW



#### Project Description:

The theme of this project is flow (which is also the title) and augmented artistic collaboration with machine learning. In this project I will explore some of the elements of machine learning and its utility in my artistic practice, in order to enhance and aid the relationship between the "artist and the tool" – or "artist – tool/machine – artist" – each of us shaping the other, in various ways.

The final output will be a documentation of a performance. The exact form of the output is unknown at this point, and will be determined by what happens when I assemble the different elements and modules of the project. It could be any or all of these things - a recording of the performance, web application with pre recorded material and other elements, assembled short multimedia piece or just a digital print of a screen from the performance. At this stage in the work I am leaning towards an assembled short multimedia piece, which could be presented as a standalone installation.

My intention is to design the project to be modular. This means I will break the project down into modular elements, which I can move around and combine as I want in order to illustrate whichever narrative I desire, as I need to – and to be able to do so fluidly.

Considering my current preference for the form of the final output, I will most likely include sound synthesis along with graphic synthesis to create an immersive experience. These elements will respond to my input, as the artist, in real time – and generate an output in response which is a modified version of the previous state.

The technical side of the project will mainly consist of different aspects of machine learning, such as face recognition/detection and pose estimation with PoseNet, but the artwork will not be limited solely to this. I will also create visuals either in JavaScript or C++, depending on the raw power needed for graphics synthesis and create sound either dynamically through live performance or pre-created in a DAW. These are some of the possibilities at hand. They might change through my production stage as need dictates.

All the equipment needed to produce the elements set out above are the only physical elements in this project, other than the physical space in which the "performance" will happen and the actual performer(s). Even this physicality will be blurred and bleed into a virtual space e.g. recording physical space and performance into a digital environment to be synthesised, altered and projected externally back onto physical space and performance.

This project is an accumulation of much inspiration and many ideas. One of the threads is coming from performance art, including the digital artist who created a tool for theatre Kyle Mc Donald, Goldsmiths lecturers in their own artistic practice, the Google research project with PoseNet in collaboration with dancer Bill T. Jones, and Antoine Shmitt (CliMax), among others. The other thread is coming from macro photography – videography, where a creator can channel and direct an observer to be immersed in a specific and "isolated view" through framing, depth of field and/or perspective. I'm curious what it would look like if I combine both of these into one form, in a multimedia installation.

#### Technical context:

With this creative project, I intend to further my understanding and explore the phenomenon of machine learning and its utility in human interaction between machine and human, in my case, that of artist – tool.

I will use elements from the Machine Learning for Creative Practice module, to design the interface model between the user and the code.

The other element I intend to attach to the base code is sound synthesis and image synthesis in JavaScript or C++.

Designing a workflow, which will enable me to create a loop of input and output through some sort of interaction.

This loop is going to be achieved at one end with various webcams or cameras, and with projector on the other. In between goes the laptop with a combination of software in a formation processing information for output.

The final project could be either screen recording, or a recording of the whole show, or both (maybe in a form of an upload or stream) and it could be a generation of raw material for a multimedia installation.

#### Production plan:

Project in pieces:

Building the framework for the artwork, which will host all the pieces when connected. I carefully need to consider the size of it, as it will determine the scope of the project.

Ideation and experimentations. Exploring other possibilities.

Selecting the elements. Build a pipeline for an input and output. Building the interface. Connecting all/ some of the elements for sketching out ideas.

When all previous stages are complete, I will connect all the modules together, in order to see how all works in unity. This time is for troubleshooting communication errors and bugs between elements of the artwork. Testing at this stage the reliability and performance of the components. It can determine which direction or shape the project will take. Airing out produced ideas and setting direction. Creating a Naïve version.

Naive version:

This version is an early development stage, which draws on my "Project in pieces" stage. In this stage I will focus mainly developing the code of my output, and connect it to my input source. Sketching out some visual direction - give a form.

Prototype A:

<u>The prototype A</u> stage will have some of the elements connected for testing and adjustments considerations. I will collect data of some users, in order to adjust <u>design</u> and functionality. This is the time to set direction for the project.

Prototype B:

At this stage, most of the elements and functionalities are set, and only minor adjustments will take place. At this time I will focus on presentation of the work. The final touches.

Released version: A done artwork ready to be displayed in a form most suitable for this version.

Wrapping up and Write up: Releasing the work into the public. Write up the project and make reflections

#### PROJECT TASK MANDALA Workflow and elements (modular - cyclical)

START	FORM	OUTPUT						
CLEAR IDEA	VISUALS SOUND	ASSEMBLING						
-Assembling a clear concept from aired out ideas.	<ul> <li>Experiment with visuals.</li> <li>Choose a visuals palette matching the sound.</li> <li>Choose a sound palette matching the visuals.</li> </ul>	<ul> <li>Assemble all the modular elements in the project.</li> <li>Try out different ways, orders and solutions.</li> </ul>						
	USER INTERFACE							
MAKE A PLAN	ARTIST LIVE CONTROLS DANCER LIVE CONTROLS OSC LIVE CONTROLS	TESTING						
-Identify stages, elements and categories. Create a timeline.	- Identify parameters to control - Connect parameters to controls	- Test the prototypes with and without the dancer and user. -Test in different scenarios.						
	TOOLS AND PLATFORMS							
MAKING MODULES	- Identify software to use - Identify hardware to - Identify skills needed	DISPLAYING - Identify ways of display						
-Making individual parts and combining them.	in the project. - Utilize it or attain one. - Utilize it or attain one.	online and physically. -Do it.						

### Tools, equipment and knowledge:

This work consists mostly of developing code based algorithms and then manipulating it in existing software on available equipment.

Most likely, my biggest challenge is going to be assembling all of the elements together in seamless workflow with an elegant aesthetic.

The machine learning algorithms and codes part of this project is already underway, which I'm developing in the <u>Data and Machine Learning for Creative Practice</u> module in my 1st semester. This way of working is is very handy, as I can prototype simultaneously as I'm progressing in that module.

By the end of that module, I will have a clear overview of which elements I can lift and incorporate into my project.

The challenge I anticipate at this stage could be the lag while running a ML model and the graphics manipulation at the same time. I have already experienced this, despite my laptop indicating plenty of resources e.g. RAM, GPU and CPU.

I think designing an efficient pipeline will reduce this problem. If not, prerecording certain elements could solve the problem.

Apart from the Goldsmiths ML module, the <u>Coding Train</u> tutorials with Daniel Shiffman on <u>mI5</u> and <u>Neural Networks</u> helped me significantly to further my understanding of ML.

I will use this heavily in this project along with the programming skills (JavaScript, C++) cultivated in year one and two at Goldsmiths DAC.

I have acquired all the necessary equipment for this project, so I can run test and experiments from the very beginning. This helps me to shape the project and not speculate until the last moment. Testing the software-hardware with the code snippets is useful exercise, as I can run into problems sooner rather than later and deal with them promptly. Also it helps me to refine the ideas.

Hardware I foresee using in this project is: laptop, external screens, projector, various webcams(regular, 360, integrated), photo and video equipment (prerecording and documenting), sound recorder(soundtrack), speakers(for the dancer).

Along the essential equipment I also managed to obtain all the software need. Most of them I used before for my art practice or for my studies, however there is one, with which I need to get familiar in the next term. "MAX 8" will be part of the curriculum in Digital Performance module, where I will learn and try to incorporate it to my project if I feel a need for it.

Software I foresee using in this project is: Code IDE (Visual Studio, Brackets), DAW(Ableton Live), Interactivity tool(MAX 8), Open Broadcast System and Virtual Webcam(OBS, ManyCam) and Resolume Arena for projection and media blending before the output.

The majority of tools, equipment and knowledge I attained from my previous practice and the preceding two years on this course. I deliberately left space for a healthy amount of uncertainty, so I can evolve and grow. Combining older experience with new is quite exciting.

#### WORKFLOW (fluid)







time/left/closed/posx 0.656143
address/left/closed/posx
time/left/closed/posz -0.268668
address/left/closed/posz
time/left/closed/posx 0.648117
address/left/closed/posx address/left/closed/posx time/left/closed/posx etame/left/closed/posz time/left/closed/posx etame/left/closed/posx time/left/closed/posx time/left/closed/posx time/left/closed/posx time/left/closed/posx etdmesr/left/closed/posx etdmesr/left/closed/posx address/left/closed/posx time/left/closed/posz -0.251079 address/left/closed/posz Output

Show output from Debug '072\_05C\_deco\_test\_\_bebg.exe' (Van32): Unloaded 'C:\kandows\Sy The thread Bulesh has exited with code @ (8x8), '072\_05C\_deco\_test\_\_debug.exe' (Van32): Loaded C:\kindows\Sys '072\_05C\_deco\_test\_\_debug.exe' (Van32): Loaded C:\kindows\Sys







40 18

nter 127 ctin 8 ctin 9

> •

ctiout 10 ctiout 12







	00	00		
	Twitch Drunk	Trails Bzzz		
Monitor				
	a ▶ Wave Warp	Big Wave B ×		
	▶ Twitch			
	r ▶ Trails	Presets B X		
	Distortion			
	a ▶ Wave Warp			
	► Shift RGB			
	a ► Hue rotate			
	Flip	Soft Mi B X		
	a ▶ Strobe	Presets B X		
	Fade Out 1.00			





× metro 10n

+ 36 

makenote 127 200

noteost

pgmout

#### Scope and feasibility:

The most challenging part of the project will be definitely to keep the right scope of the project in balance. It is hard to know in advance how much time is needed for something I have never done before.

Sometimes obtaining technical knowledge consumes high levels of attention, energy and focus. I would like to stretch my technical knowledge and learn from the process, however I would like to leave some space for creative expression – to not solely be showcasing technique.

Both of those are valid considerations for me, as I build the project.

Possible pitfalls could emerge from complexity and compatibility inherent in trying to bring so many elements together. This can lead to running out of time. I can prevent or mitigate this risk by giving myself enough time to build my artwork. Advance preparations and timely execution can reduce unnecessary stress and increase efficiency during the building period.

The scope of the project will follow the idea to make the artwork seamless and elegant. What I mean by that is, to achieve balance between the machine assisted creativity and our own human spark.

I will end up probably improving and modifying the work, until I run out of time. With this in mind, I am assembling the prototype B quite sooner in the process than I would normally. This way I can give myself plenty of time to work on the final touches and playing with the artwork.



### Thinking about audience:

Ideally, I would like to leave the relationship open between the art and the audience, and let them discover each other.

I can partially test this at different stages, especially in the "naive stage", however the in depth testing can only be done, when the piece is done and displayed is some form or another.

Until then, I can break down the work into elements and modules and test the effect of individual pieces in my immediate surrounding. For example, I can test how the visuals or sound feels to subjects asked, or to test the interface on them. I can also consider to start the collaboration process with the performer fairly soon and get a detailed feedback on how the whole artwork resonates.

I'm not yet sure about the full scope of the audience experience, as the display of the artwork is still open to possibilities and exposed to uncertainties.

There are a few combinations I'm considering right now:

- One is to make one of the audience member as a dancer and the rest to observe(actively or passively).
- Second option would be that I assign a dedicated dancer and the audience is observant(active or passively).
- Third would be that I display the recordings in some form and the audience will witness history packaged in a form of art.

Overall, I would like the piece to create a sublime atmosphere, where a viewer can experience an altered state of awareness of any kind. I would like to avoid packaging this work as art, but rather present it as something to be interpreted individually.



#### Conceptual context – artist statement

#### "Flow"

Space and motion (machine mimicry)

With this creative project, I intend to explore the phenomenon of motion in multiple manifestations of space (physical, digital) and our perception of this space. To observe the quality in each space and to see the connecting threads between modes of perception.

This interaction and blurring into spaces is mediated through machine, and so the human dancer will end up transmitting some of the human qualities onto algorithms. To become a human-like machine and augment our experience with machine-like properties is a very interesting phenomenon to examine in my view.

With the aesthetic of the piece I would like to point out the relationship between early human experiencing of art and the modern expression of it. The contrast of these elements could generate some interesting effects.

-An example of this contrast would be - a simple smoke trail (ancestors watching fire and smoke and being mesmerised) combining with an iconic green rectangle in computer vision (a surveillance guard staring a wall of screens and the green rectangles (boxing human form) moving across the frame – leaving rectangle trails behind – like a light painting).

Some questions and thoughts came to my mind as I was imagining this project. A few of them are:

- Can we reduce everything to mere "science" and data? - if not, why not?

- The sublime and beauty of it all.

#### Style and concept variations:











